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Substitute Potatoes with Cempedak Seeds in Making Potato Donuts

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Abstract

Purpose of the study: This study aims to (1) assess the final appearance of donuts made with cempedak seeds, (2) evaluate the aroma produced, (3) examine the texture achieved, and (4) determine the taste of donuts incorporating cempedak seeds as a key ingredient.

Design/methodology: The study employs an experimental research design, in which donuts were produced using cempedak seeds, the preparation process was systematically observed from beginning to end, and the outcomes were recorded to generate a report that can be presented and evaluated.

Finding: The results indicate that cempedak seeds can serve as a viable substitute for potatoes in potato donut production and are well accepted by panellists in terms of sensory attributes.

Research limitations/Implications: This research offers potato donut producers an alternative ingredient option to potatoes, potentially supporting product diversification and innovation in donut production.

Novelty/Originality of the study: This study is among the first to explore cempedak seeds as an alternative raw material in potato donut production, providing empirical evidence on their sensory performance and potential application in local food product development.

INTRODUCTION

Donuts are generally made with wheat flour mixed with leavening agent or yeast, then fried in oil. Donuts are known for their round shape, with or without a hole in the middle, and are usually filled with jam (Krondl, 2014). Donut dough generally consists of wheat flour with a high protein content, eggs, yeast, sugar, salt, milk, margarine or butter, and water (Elechi, 2020). The process of making donuts is almost similar to the process of making bread, which involves making dough and a rising process. However, the difference lies in the final stage, where the donuts are fried using deep frying while the bread is baked (Shih, 2001).

Potato donuts first appeared in the mid-20th century, namely in 1938, when they were introduced in a cookbook published at that time entitled Glenna Snow (Edge, 2006). Usually, potato donuts have a lighter texture than regular donuts made with wheat flour, this is due to the addition of potatoes which gives extra softness to the dough. Potato donuts have a richer and unique taste, as well as a slightly natural sweetness from potatoes, have a better moisture level because potatoes help retain moisture in the donuts, and also have a paler color because the potato content in them becomes colored after boiling pale (Subhi et al., 2022). Then the manufacturing process is the same as making other donuts, the only difference being the ingredients by adding boiled and mashed potatoes or potato flour (Dawood et al., 2015; Tortoe, et al., 2017).

Cempedak fruit (*Artocarpus champeden sp*.) has the potential to be used as a raw material in the food processing industry, including making flour, pasta and ready-to-eat food ingredients (Putri & Rosida, 2025). Cempedak is a native plant from Southeast Asia and is widespread in the Tenasserim region in Burma and Peninsular Malaysia, including Thailand. Cempedak fruit is also spread in several regions in Indonesia such as Sumatra, West Java, Kalimantan, Sulawesi, Maluku and Papua (Muchlis et al., 2017). Cempedak fruit has thick, sweet and aromatic flesh. Physically, this fruit resembles jackfruit and has an aroma similar to durian (Verheij & Coronel, 1997; Anshari et al., 2010).

Potato (*Solanum tuberosum L*.) is one of the main food crops in Indonesia, after rice and corn. The potato plant has great potential as one of the main sources of carbohydrates for humans in Indonesia (Rohima et al., 2024). Potatoes are often used as vegetables and raw materials in large industries to make flour and chips. Apart from that, this commodity is very important to use in household businesses (Mulyono et al, 2017; Rogi et al, 2016).

Based on the background above, the authors chose to make a donut experiment using processed cempedak seeds because potatoes and cempedak seeds have almost the same texture after the boiling and pounding stages, so the author made a research by substituting potatoes with cempedak seeds. Apart from that, the reason the author uses replacing potatoes with cempedak seeds in making donuts is to provide several significant benefits. First, in terms of availability and cost, cempedak seeds are often easier to obtain and more affordable in some regions compared to potatoes, cempedak seeds provide a unique taste and texture to donuts, creating an attractive variation for consumers who want something different from conventional donuts, so they become a unique attraction that expands the product's market reach. In this research, the author has carried out a pre-experiment, namely by substituting potatoes with cempedak seeds 4 times with percentages of 0% (control), 25%, 50%, and 100%. As a result of the pre-experiment, the author chose to use a percentage of 100% cempedak seeds because the appearance, texture and taste are almost the same as potato donuts which use 100% potatoes.

LITERATURE REVIEW

Doughnut

The word doughnut comes from English which is a combination of two words, namely doug and nut which originally meant a small round shape like a nut, in other word doughnut literally means small round dough. Initially, donuts were balls of cake fried in lard until golden brown (Steinberg, 2004). In the early 19th century, the Dutch made olykoeks which can be translated as oil cake, when Dutch immigrants began to settle in the United States the tradition of making olykoeks continued and was later influenced by other cultures and underwent a transformation into the donuts we know today (Mullins, 2008).

As time goes by, donuts have undergone many changes, for example by adding potatoes to the dough. Potato donuts or often called Spudnuts, are a type of donut that has a sweet taste and is made with mashed potatoes as the main ingredient or using potato flour as a substitute for all wheat flour which is generally used to make donuts (Etymonline, 2024). Potato donuts have the characteristics of being soft and light, they have a light potato taste which makes these donuts unique, potato donuts tend to be more moist and not dry out quickly. Apart from that, the appearance of potato donuts is slightly different from wheat flour donuts, namely they are smoother and can look denser. Donuts are a type of dough that is enriched with a higher content of fat, eggs and sugar, so that the donuts have a soft texture from the addition of milk and eggs in them (Melito & Farkas, 2012; Krondl, 2014; Smith, 2018).

Cempedak Seeds

Cempedak or Artocarpus champeden sp has the potential to be used as a raw material for the food processing industry, including making flour, pasta and ready-to-eat food ingredients (Aziz & Zabidi, 2011). Cempedak is a native plant from Southeast Asia and is widespread in the Tenasserim region in Burma and Peninsular Malaysia, including Thailand. Cempedak fruit is also spread in several regions in Indonesia such as Sumatra, Java, Kalimantan, Sulawesi, Maluku and Papua (Verheij & Coronel, 1997; Anshari et al, 2010).

Cempedak is a fruit plant belonging to the Moraceae family. Cempedak fruit has an elliptical shape with varying colors ranging from greenish, yellowish, to brownish. Cempedak skin is thinner than jackfruit skin, but the surface is rough, although not as rough as jackfruit. The flesh is thin and more fibrous than jackfruit, with a deep yellow color. Like jackfruit, cempedak seeds can also be eaten after they are boiled. Cempedak seeds have dimensions comparable to human fingers and are coated with a layer of wax, with a dense texture and white color. Apart from that, cempedak seeds also have the potential to be made into flour because they have a high starch content (Anshari et al., 2010; Winarti et al., 2022; Riyadi, 2023).

Potatoes

Potatoes (*Solanum tuberosum L.*) were first discovered in the Cisarua region, Cimahi, West Java, in 1794. This type of potato grown in Cisarua came from the United States and was introduced by European colonists. The potato variety that was first introduced to Indonesia by Eigenhiemer (World Potato Atlas, 2005). Potatoes have various types and varieties that differ in shape, size, skin color, shelf life, chemical composition, processing properties, and maturity. Based on the color of the skin and tuber flesh, potatoes are divided into three groups: yellow potatoes, white potatoes and red potatoes (Jansen & Flamme, 2006; Salunkhe et al., 2021).

The function of potatoes in making donuts is to add a sweet taste that is not found in sugar. Apart from that, the function of potatoes in making donuts is also to provide a softer texture on the inside and crispy on the outside.

The addition of potatoes also makes the donuts take longer to harden compared to donuts that only use flour. In the research conducted by the author, potatoes were used as ingredients for comparison donut products. To make potato donuts, the types of potatoes that are often used are starchy potatoes or potatoes that have a high starch content such as russet potatoes and Idaho potatoes. This type of potato usually has a drier texture and absorbs liquid more easily, so the resulting potato donuts are softer and more tender (Mentari, 2021; Saladino, 2012).

METHODOLOGY

Product Approach and Development Procedures

Research methods are scientific approaches used to collect data with a specific purpose. The main aspects that need to be considered before conducting research include the research object, initial data, as well as factors such as time, energy, and techniques needed to process the data after it has been collected. It is important for research methods to be adapted to the procedures, techniques, tools and type of research to be carried out in order to support appropriate decision making. Research procedures are procedures used to collect data to answer research questions (Arikunto, 2010; Sugiyono, 2019).The author uses experimental research methods. Experimental research involves conducting experiments on a particular phenomenon or product, observing the process from start to finish, and recording the results of the experiment to produce a report that can be presented and assessed (Ross & Morrison, 2013).

In this experimental process, the author has carried out pre-experiments 4 times, namely by substituting potatoes with cempedak seeds. The substitutions used in the experiment were comparator, 25%, 50%, and 100%. Apart from that, the author has observed the results of the pre-experiment and recorded the experiments that have been carried out. As a result of this pre-experiment, the author made the decision to substitute 100% for potatoes with cempedak seeds.

In making the experiment there are several procedures that can be carry out, first choose the right recipe for the experimental product to be tested, then adapt the ingredients to be used. In this experiment, both products, comparison and experiment, used the same formulation and method, only by replacing potatoes with cempedak seeds. Second, conduct a pre-experiment by replacing 100% of potatoes with cempedak seeds. Third, determine the experimental design and conduct the experiment. Fourth, make observations to determine the differences in color, taste and texture in making donuts using cempedak seeds. Fifth, conduct a panelist test to determine the level of preference for donuts that use cempedak seeds. Sixth, analyzing and processing data results obtained by the author from the panelist test results. Finally, draw conclusions from the author's experiments based on the data results that have been obtained (Barrett et al., 2010; Aramouni & Deschenes, 2014).

Data Collection Technique

Library Resource

Literature study is a process in which someone investigates various reference sources such as books and previous research results related to the problem to be investigated, with the aim of obtaining a theoretical basis. Another definition of literature study is that it relates to the exploration of theories and references related to values, culture and norms that exist in the context of the social situation to be studied (Sarwono, 2006; Sugiyono, 2019). Therefore, the author conducted a literature study to obtain literature and a theoretical basis for the experiments to be carried out. Literature study sources used by writers can come from various media such as books, magazines, journals, articles and the internet.

Observation

In this research, the author applies the observation method. Observation has unique features that differentiate it from other data collection techniques. The observation method is a systematic process of observing and recording various aspects that occur in the research object (Sugiyono, 2019; Widoyoko, 2014). In this research, the author used the observation method to determine the final results in terms of appearance, aroma, texture and taste in making donuts using cempedak seeds.

Questionnaire

A questionnaire is a data collection technique that involves sending a series of questions or written statements to respondents to answer (Sugiyono, 2019).The author uses a questionnaire data collection technique because it is more effective and efficient. In addition, questionnaires can be distributed to many respondents in a short time and at a relatively low cost compared to other methods such as face-to-face interviews. Questionnaires also allow researchers to ask the same questions to all respondents, thereby minimizing variations in the way questions are asked and answered that will helps in obtaining consistent data (Brace, 2018).

Data Measurement Techniques and Analysis Techniques

In this research, the author uses data measurement techniques by utilizing organoleptic tests to evaluate attributes such as color, taste and texture of the product. Organoleptic tests, which are often referred to as sensory tests or sensory tests, use human sensory abilities as the main tool for evaluating responses to a product. The various senses involved in this organoleptic test include the senses of sight, smell, taste and touch. The results of this sensory evaluation are then used to assess the product based on the perceptions obtained by the senses or sensors (Saleh, 2004).

Apart from that, to determine the level of people's liking for the experimental product created, the author also used a hedonic test. The hedonic quality test only indicates how much the hedonic quality test panelists liked the product, which reflects an evaluation of positive or negative quality. This hedonic quality assessment is more detailed than just whether you like it or not in general (Rousset & Martin, 2001).

The hedonic test, also known as the likeability test, involves panelists providing subjective responses regarding their level of satisfaction with the product. The hedonic scale, which is converted into a numerical scale with increasing numbers according to the level of satisfaction, reflects the panelists' responses to the product. The author uses a scale from 1 to 5 (with a scale of 1 indicating the appearance, aroma, texture and taste that you really don't like and a scale of 5 indicating that you really like the appearance, aroma, texture and taste) see table 1.

Panelists are needed who are able to assess the product objectively to obtain organoleptic results. These panelists can consist of individuals who are experienced or inexperienced in assessing the product to be tested. In this study, for organoleptic testing, the author involved panelists who were laypeople or non-experts, namely individuals who did not receive formal training but were able to differentiate and provide responses to the organoleptic evaluation given. To carry out this organoleptic test the author needs a panelist of between 25 and 100 people who are inexperienced (Soekarto, 2002). For this organoleptic test, the author chose to use 30 people who were not experts or laypeople to assess comparative and experimental products.

Table 1: Rating Scale

Assessment Category	Grade
Greatly Dislike	1
Dislike	2
Quite Like	3
Like	4
Strongly Like	5

Source: Sugiyono, (2019)

Based on the numerical data that has been provided previously, statistical analysis can be carried out by calculating the percentage of the evaluation given by the panelists, according to a predetermined formula, namely:

$$P = \frac{f}{n} \times 100\%$$

Explanation:
P = persentase
f = frekuence
n = lots of data
100% = fixed amount

Data from this percentage result is used to make it easier for the author to find out how many panelists like or dislike the experimental product that has been made. To find out the average of the presentation results, the author uses the average formula, namely:

$$\bar{X} = \sum \frac{Fi.Xi}{n}$$

Explanation:
$\bar{x}$ = average
n=number of panelist
∑fi=number of frequencies
∑Xi=grade

This average value will be used by the author to ensure the product meets the expected quality standards and is well received by consumers. So that the author can find out the final result of the total average score obtained, an interval table is needed. To find the interval table, the formula used is:

$$Interval = \frac{\text{The Highest Score} - \text{lowest value}}{\text{Number of Types of Assesment Criteria}}$$

With the data we have, we get results like :
Number of panelist = 30

Interval $= \frac{5-1}{5} = \frac{4}{5}$

Interval $= 0{,}8$

Based on the data above, the interval for assessment is 0.8. So the following interval table is obtained

Table 2: Assessment Interval Scale

Scale	Assessment Criteria
1 – 1,8	Greatly Dislike
1,9 - 2,6	Dislike
2,7 - 3,4	Quite Like
3,5 - 4,2	Like
4,3 - 5	Strongly Like

Source: Sugiyono, (2019)

In this research the author used descriptive analysis techniques. Descriptive analysis technique is a form of statistics that is used to analyze data by providing an overview or description of the data that has been collected as it is, without the intention of making generally applicable conclusions or generalizations. This descriptive analysis technique was carried out by the author to analyze the differences in appearance, aroma, texture and taste of the research results that have been studied so that they are easier to understand (Sugiyono, 2019).

RESULT

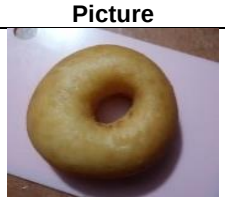
Experimental Phase

Preparation

The kitchen tools used in making comparative and experimental donuts are scale**,** bowl, piler, spoon**,** gas stove**,** pan, chopsticks, scrapper, knife, measuring jug**,** blender.

Pre-experimental

Table 3: Pre-experimental results

Picture	Phase	Result
	Comparison	• Appearance: golden brown, the surface smooth • Aroma: There is no potato aroma, there is a slight yeast aroma • Texture: soft • Flavor: sweet, little potatoes tasted
	Exsperiment 25%	• Appereance : golden brown, the surface smooth • Aroma : there is no smell of potatoes or cempedak seeds, a slight aroma of yeast • Texsture : soft • Flavor : sweet, there is no taste of potatoes or cempedak seeds
	Experiment 50%	• Appereance : yellow slightly brown, slightly rough surface. • Aroma : there is no smell of potatoes or cempedak seeds, a slight aroma of yeast • Texsture: has a slightly rough and little crunchy texture • Flavor : little sweet, there is no taste of potatoes or cempedak seeds
	Experiment 100%	• Appereance : golden brown, the surface is a bit rough • Aroma : there is no smell of potatoes or cempedak seeds, a slight aroma of yeast • Texture : has a slightly rough and little crunchy texture • Flavor : little sweet, after taste there are cempedak seeds tasted.

Source : Author's Processing Results, (2024)

From the results in table 3 pre-experiment that the author has carried out, the author took a 100% experiment, namely by replacing 100% of potatoes with 100% cempedak seeds.

Experiment plan

Table 4: Experiment Plan

Ingredients	Comparison	Exsperiment 100%
Potato	100%	-
Cempedak Seeds	-	100%

Source: Author's Processing Results, (2024)

From the results of the experimental design in table 4, the author has chosen the 100% experiment because it has almost the same taste and appearance as the comparison donut.

Recipe Used

Table 5: Recipe Comparison and Experiment
Yield: 56 pcs

No	Inggridients Comparison	Quantity	Ingredients Experiment
1	Hard Flour	1000 gr	Hard Flour
2	Milk Powder	150 gr	Milk Powder
3	Yeast	25 gr	Yeast
4	Sugar	180 gr	Sugar
5	Potato	100gr	Cempedak Seeds
6	Fresh Milk	500 ml	Fresh Milk
7	Egg Yolks	8 pcs	Egg Yolks
8	Margarine	100 gr	Margarine
9	Salt	20 gr	Salt

Source: Author's Processing Results, (2024)

Cooking Method

Table 6: Cooking Method Comparison and Experiment
Yield : 56 pcs

No	**Method**	**Inggridients**	**Explanation**
1	Mice and place		Ingredients and tools to used
2	Boil	Potato Cempedak Seeds	Until potato soft (30 minutes) Until cempedak seeds soft (60 minutes)
3	Mash	potatoes cempedak seeds	With hand blender until smooth (without water)
4	Mixed	Hard Flour Sugar Milk Powder Yeast	Into bowl until mixed well
5	Add	Potatoes Cempedak Seeds	Into dry ingredients and mixed until all combine
6	Mixed	Egg yolks Fresh milk	Until all combine
7	Pour		Liquid ingredients into dry ingredients slowly and stir until dough half smooth
8	Add	Margarine Salt	Into dough and stir again until all combine and dough smooth
9	Rest		Dough for 20 minutes and cover with wet cloth
10	Take out		Dough from bowl and then knocking back
11	Scale		Dough for 30gr/pcs
12	Molding		Doughnut dough make it round then flatten it
13	Cut		the middle becomes round
14	Rest		Doughnut dough that has been formed on a sheet pan then rest again for 60 minutes
15	Fried		Doughnut dough with heat oil until golden brown (can only be reversed once)
16	Lift		Doughnut when it is golden brown then drain

Source: Author's Processing Results, (2024)

Table 1: Result Experiment & Comparison

Experiment	Phase	Comparison
	Bulk Fermentation	
	Final Proof	
	Final Result	
	Top	
	Inside	

Source: Author's own documentations, (2024)

Observation

In this research, the author has carried out experiments 5 times which were carried out at the author's house. This research involves substituting potato ingredients with cempedak seeds in making potato donuts. This research produced experimental potato donut products and comparison potato donuts by using the same manufacturing method for each product.From the experiments carried out by the author 5 times, there are observation results obtained in the assessment of 4 aspects, namely appearance, aroma, texture and flavor.

Appereance

In terms of color, based on the results of the experiment, the comparison donuts had a more golden yellow color because the color of the potatoes themselves after being boiled was yellow and the experimental donuts had a yellow-brown color because the color of the cempedak seeds themselves after being boiled were white-brown. Therefore, in terms of color there are differences. Apart from that, another thing that happened was that the experimental donuts browned more quickly when fried for several reasons related to the chemical and physical

composition of the cempedak seeds. Cempedak seeds contain higher levels of natural sugar and during the frying process this sugar undergoes a Maillard reaction which causes the color to change to brown. In addition, the enzymes in cempedak seeds can speed up the browning reaction by converting sugar into brown compounds when heated. Cempedak seeds also contain starch and protein which can contribute to the Maillard reaction and caramelization during the frying process, whereas the comparison donuts do not (Belitz et al, 2009).

In terms of size, the comparison donuts and experimental donuts did not have much different sizes because they used the same dough weight. In terms of proofing, the experimental donut took 10 minutes longer because it was heavier in mass than the cempedak seeds compared to the comparison donut which had a slightly lighter mass. And for frying time, the experimental donuts were faster because they browned easily compared to the comparison donuts. In terms of appearance, the comparison donuts had a better appearance compared to the experimental donuts. the comparison donut had a smoother surface compared to the experimental donut which had a slightly rough surface.

Aroma

In terms of aroma, based on the results of experiments carried out by the author, there is no difference between the experimental donuts and the comparison donuts. The aroma that came out of the experimental donuts and the comparison donuts was just the aroma of fried yeast.

Texture

In terms of texture, based on the results of experiments carried out by the author, the comparison donuts have a softer and smoother texture. This happens because the texture of the boiled potatoes is very smooth, which affects the final texture produced, namely smooth and soft donuts. Meanwhile, the experimental donuts had a slightly rough texture. The slightly rough texture is obtained because cempedak seeds have natural fibers and texture which may not be completely smooth even though they have been processed so that the fibers can give a rough texture to the experimental donuts. The experimental donuts had a crunchy texture when eaten, while the comparison donuts had no crunchy texture.

Flavor

In terms of flavor, based on the results of experiments carried out by the author, the comparison donut has a sweet taste, the taste of potato does not appear, and the after taste has a slight taste of yeast. Meanwhile, the experimental donuts have a taste that is not too sweet, when you eat them you don't taste cempedak seeds but on the after taste there is a thin taste of cempedak seeds and there is a taste of yeast..

Panelist Questionnaire

Based on the results of distributing questionnaires carried out by the author on 31 May 2024 – 01 June 2024, the panelist test results were obtained from 30 inexperienced people. The following are the results of the panelist test questionnaire.

Appereance

Table 2: Result Hedonik Appearance

Product	**Exsperiment Product**					**Comparison Product**				
Skor	1	2	3	4	5	1	2	3	4	5
F	0	1	9	16	4	0	2	11	15	2
Persentase	0	3%	30%	54%	13%	0	7%	36%	50%	7%
Fi.xi	0	2	27	64	20	0	4	33	60	10
$\sum$**fi. xi**			**113**					**107**		
$\bar{x}$			**3,8**					**3,6**		

Source: Author's Processing Results, (2024)

Aroma

Table 3: Result Hedonik Aroma

Product	**Exsperiment Product**					**Comparison Product**				
Skor	1	2	3	4	5	1	2	3	4	5
F	0	2	10	14	4	0	3	14	10	3
Persentase	0	7%	33%	47%	13%	0	10%	47%	33%	10%
Fi.xi	0	4	30	56	20	0	6	42	40	15
$\sum$**fi. xi**			**110**					**103**		
$\bar{x}$			**3,7**					**3,4**		

Source: Author's Processing Results, (2024)

Texture

Table 4: Result Hedonik Texture

Product	Exsperiment Product					Comparison Product				
Skor	1	2	3	4	5	1	2	3	4	5
F	0	1	10	10	9	0	3	8	15	4
Persentase	0	3%	33%	33%	31%	0	10%	27%	50%	13%
Fi.xi	0	2	30	40	45	0	6	24	60	20
$\sum \mathbf{fi.xi}$			**117**					**110**		
$\bar{x}$			**3,9**					**3,7**		

Source: Author's Processing Results, (2024)

Flavor

Table 5: Result Hedonik Flavor

Product	Exsperiment Product					Comparison Product				
Skor	1	2	3	4	5	1	2	3	4	5
F	0	3	3	18	6	0	4	7	15	4
Persentase	0	10%	10%	60%	20%	0	13%	24%	50%	13%
Fi.xi	0	6	9	72	30	0	8	21	60	20
$\sum \mathbf{fi.xi}$			**117**					**109**		
$\bar{x}$			**3,9**					**3,6**		

Source: Author's Processing Results, (2024)

DISCUSSION

Appereance

Based on the results of observations made by the author, in terms of appearance there are differences in color between the experimental donuts and the comparison donuts. The comparison donut has a slightly brownish yellow color because the color of the cempedak seeds after boiling is slightly brown and the comparison donut has a golden yellow color because the color of the potato after boiling is yellow. In terms of size and shape, there is no difference because they use the same grammar and shape.

Based on the data from the organoleptic test questionnaire that the author conducted, the panelists, totaling 30 untrained people, preferred the appearance of the experimental donuts, with an average value of 3.8 and the comparison donuts had an average value of 3.6. From the average resulting from the two products based on questionnaire data, namely the appearance of the experimental donut product and the appearance of the comparison donut product fall into the like interval value criteria.

Aroma

Based on the results of observations made by the author, in terms of aroma there was no difference between the experimental donuts and the comparison donuts. The aroma that comes out of the two donut products is the aroma of yeast. To compare the aroma of donuts, the authors used the sense of smell, where panelists were not trained to assess the aroma of donuts based on intensity and aromatic quality.

Based on the data from the organoleptic test questionnaire that the author conducted, the 30 untrained researchers preferred the aroma of the experimental donuts with an average value of 3.7, while the comparison donuts had an average value of 3.4. The average value produced by the two products is based on the questionnaire data obtained, namely that the aroma of the experimental donut product is superior and falls into the liking interval value criteria, while the aroma of the comparison donuts falls into the moderately liking interval value criteria.

Texture

Donut texture is one of the key factors that determines the quality and enjoyment of the product. Based on the results of observations made by the author, in terms of texture the experimental donut product has a slightly rough texture compared to the soft texture of the comparison donut product. This is because the texture of the potatoes after boiling is very soft compared to the texture of the cempedak seeds which are slightly rough after boiling, thus affecting the final texture of the donuts. To determine the texture of the two donuts, use your sense of touch.

Based on the data from the organoleptic test questionnaire conducted by the author, the panelists, totaling 30 untrained people, preferred the texture of the experimental donut product with an average value of 3.9, while the texture of the comparison donut product had an average value of 3. 7. For the average value produced by the two products, based on the questionnaire data obtained, the texture of the experimental donut product and the texture of the comparison donut product were included in the interval value liked by the panelists.

Flavor

Based on data from observations that the author has made, there is no striking difference in terms of the flavor of the experimental donut product and the flavor of the comparison donut product. The only difference was that after eating the experimental donut product, there was a thin aftertaste of cempedak seeds, while the comparison donut product did not taste like potato. In terms of sweetness level, the experimental donut tasted slightly less sweet than the comparison donut product which had a sweet taste that came from the potato itself.

Based on the data from the organoleptic test questionnaire conducted by the author, the panelists, totaling 30 untrained people, preferred the taste of the experimental donut product with an average value of 3.9 and the comparison donut product had an average value of 3.6. For the average value produced by the two products, based on the questionnaire data obtained, namely the taste of the experimental donut product and the taste of the comparison donut product were included in the panelists' liking interval values.

CONCLUSION

Based on observational data and panelist evaluations, this study concludes that cempedak seeds can effectively substitute potatoes in the production of potato donuts. Across four key aspects which are appearance, aroma, texture, and taste. The experimental donuts demonstrated favorable characteristics. Observations revealed that the cempedak-based donuts had a brownish-yellow color, uniform size and shape, no detectable cempedak seed aroma, a slightly less sweet taste, and a mildly crunchy texture. Organoleptic testing showed that panelists generally liked the experimental product, with an overall mean score of 3.8, indicating a positive reception. Specifically, the aroma was dominated by yeast notes and received a mean score of 3.7, while the texture, described as slightly rough, scored 3.9. The flavor, which was less sweet with a subtle cempedak aftertaste, also achieved a mean score of 3.9. These findings confirm that cempedak seeds are a viable alternative ingredient that maintains acceptable sensory qualities in donut production.

This study is among the first to systematically investigate the use of cempedak seeds as a potato substitute in donut production, offering empirical evidence on their sensory performance across appearance, aroma, texture, and taste dimensions. By demonstrating that cempedak-based donuts are not only feasible but also well-accepted by consumers, the research contributes to the development of innovative, locally sourced food products and expands the range of alternative ingredients available to small-scale food producers in the region.

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